

## AWARD/CONTRACT

1. THIS CONTRACT IS A RATED ORDER  
UNDER DPAS (15 CFR 350)

RATING

PAGE

OF PGS

1

2. CONTRACT (Proc. Inst. Ident.) NO.  
DTFA-02-01-D-041933. EFFECTIVE DATE  
01/13/20014. REQUISITION/PURCHASE REQUEST/PROJECT NO.  
00066125. ISSUED BY CODE  
FAA, NAS Acquisition Contracting Team (AMQ-210)  
6500 South MacArthur Boulevard  
P.O. Box 25082  
Oklahoma City, OK 73125-49296. ADMINISTERED BY (If other than Item 5) CODE  
FAA, NAS Acquisition Contract Mgmt. Team (AMQ-240)  
6500 South MacArthur Boulevard  
P.O. Box 25082  
Oklahoma City, OK 73125-4929

7. NAME AND ADDRESS OF CONTRACTOR (No., street, city, county, State and ZIP Code)

Communications & Power Industries  
811 Hansen Way  
Palo Alto, CA 94303-0750

8. DELIVERY

See Clause F.2 of contract

☐ FOB ORIGIN ☒ OTHER (See below)

9. DISCOUNT FOR PROMPT PAYMENT

10. SUBMIT INVOICES  
(4 copies unless other-  
wise specified) TO THE  
ADDRESS SHOWN IN:

ITEM

BLOCK 12.

CODE 99313

FACILITY CODE

11. SHIP TO/MARK FOR CODE  
FAA/MM Aeronautical Center Mark for:  
6500 S. MacArthur Blvd., P. O. Box 25082  
Oklahoma City, OK 7312512. PAYMENT WILL BE MADE BY: CODE  
FAA, Financial Operations Division (AMZ-100)  
P.O. Box 25710  
Oklahoma City, OK 73125-4913 (405) 954-4304

13. RESERVED

14. ACCOUNTING AND APPROPRIATION DATA

To be shown on delivery order(s) issued hereunder.

15A. ITEM NO. 15B. SUPPLIES/SERVICES

15C. QUANTITY 15D. UNIT 15E. UNIT PRICE 15F. AMOUNT

Accepted as to items 1.a - 1.e, 2, and 3.a inclusive, in Part I, Section B, Base Year only, and in  
accordance with negotiations.

Estimated

15G. TOTAL AMOUNT OF CONTRACT \$375,040.00

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## CONTRACTING OFFICER WILL COMPLETE ITEM 17 OR 18 AS APPLICABLE

17. ☒ CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is  
required to sign this document and return 1 copies to issuing office.)  
Contractor agrees to furnish and deliver all items or perform all the services  
set forth or otherwise identified above and on any continuation sheets for the  
consideration stated herein. The rights and obligations of the parties to this  
contract shall be subject to and governed by the following documents: (a) this  
award/contract, (b) the solicitation, if any, and (c) such provisions,  
representations, certifications, and specifications, as are attached or  
incorporated by reference herein. (Attachments are listed herein.)18. ☐ AWARD (Contractor is not required to sign this doc.) Your offer on  
RFO Number DTFA-02-\_\_\_\_\_, including the additions or changes  
made by you which additions or changes are set forth in full above, is  
hereby accepted as to the items listed above and on any continuation  
sheets. This award consummates the contract which consists of the  
following documents: (a) the Government's solicitation and your offer, and  
(b) this award/contract. No further contractual document is necessary.

19A. NAME AND TITLE OF SIGNER (Type or print)

KATHRYN OWENS, CONTRACTS MANAGER

20A. NAME OF CONTRACTING OFFICER

CHERYL MARTIN

19B. NAME OF CONTRACTOR

BY Kathryn Owens  
(Signature of person authorized to sign)

19C. DATE SIGNED

1-5-01

20B. UNITED STATES OF AMERICA

BY Cheryl Martin  
(Signature of Contracting Officer)

20C. DATE SIGNED

1/9/2001

PART I - SECTION B  
SUPPLIES OR SERVICES AND PRICES/COST

The contractor shall furnish all parts, supplies, labor, plant, fixtures, equipment, appropriate technical data, and other facilities necessary to restore the following Government-owned item(s) to a serviceable condition in accordance with the work requirement set forth in Section C hereof.

ITEM	SUPPLIES/SERVICES	Estimated Annual Quantity	UNIT	UNIT PRICE	TOTAL AMOUNT
<u>SCHEDULE I - BASIC CONTRACT (First Year)</u>					
1.	NSN 5960-00-390-5670, KLYSTRON TUBE: repair/rebuild tubes, Varian Associates, P/N VA-963A or Northrop Grumman P/N 354D362G01				
	a. ANALYSIS OF TUBE: (determine category of repair as defined in Section C.2 hereof)				
	(1) Physical	13	EA	\$ 955	\$ 12,415
	(2) Electrical	13	EA	\$ 1,330	\$ 17,290
	(3) Dissect	9	EA	\$ 1,540	\$ 13,860
	b. MINOR REPAIR as defined in Section C.2 hereof	4	EA	\$ 6,500	\$ 26,000
	c. MAJOR REPAIR as defined in Section C.2 hereof	6	EA	\$ 29,015	\$ 174,090
	d. REBUILD as defined in Section C.2 hereof	3	EA	\$ 42,300	\$ 126,900
	e. Analysis/Inspection for Serviceable/Irreparable Tubes Ref. Clause C.4 hereof	1	EA	\$ 3,055	\$ 3,055
2.	X-Ray Shielding for "Serviceable" Klystrons	1	EA	\$ 1,430	\$ 1,430
3.	ONE TIME OPTION* Standard Commercial Warranty (Line Item 1)				

(Offeror must mark one of the following blocks)

- a. ☒ Contractor is providing a standard commercial warranty at No Additional COST. Pricing shown under Price Schedule includes all warranty cost.
- b. ☐ Contractor is providing a standard commercial warranty at an Additional COST. Additional cost shall be based on the following:
- Unit price x \_\_\_\_\_ % = Warranty Cost Per Unit.
- c. ☐ Contractor is NOT providing any standard commercial warranty.

\*Exercise of this option shall be at the time of contract award. This line item shall be applicable to all subsequent years.

NOTICE TO OFFERORS: Your attention is invited to Part IV - Section L, Clause L.1, Applicability of Contractor's Commercial Warranty.

SCHEDULE II - FIRST OPTION YEAR (Second Year)

1.	NSN 5960-00-390-5670, KLYSTRON TUBE: repair/rebuild tubes, Varian Associates, P/N VA-963A or Northrop Grumman P/N 354D362G01			
	a. ANALYSIS OF TUBE: (determine category of repair as defined in Section C.2 hereof)			
	(1) Physical	13	EA	\$ 995\$ 12,935
	(2) Electrical	13	EA	\$ 1,385\$ 18,005
	(3) Dissect	9	EA	\$ 1,605\$ 14,445
	b. MINOR REPAIR as defined in Section C.2 hereof	4	EA	\$ 6,760\$ 27,040
	c. MAJOR REPAIR as defined in Section C.2 hereof	6	EA	\$ 30,180\$ 181,080
	d. REBUILD as defined in Section C.2 hereof	3	EA	\$ 43,995\$ 131,985
	e. Analysis/Inspection for Serviceable/Irreparable Tubes Ref. Clause C.4 hereof	1	EA	\$ 3,183\$ 3,183
2.	X-Ray Shielding for "Serviceable" Klystrons	1	EA	\$ 1,490\$ 1,490

SCHEDULE III - SECOND OPTION YEAR (Third Year)

1.	NSN 5960-00-390-5670, KLYSTRON TUBE: repair/rebuild tubes, Varian Associates, P/N VA-963A or Northrop Grumman P/N 354D362G01			
	a. ANALYSIS OF TUBE: (determine category of repair as defined in Section C.2 hereof)			
	(1) Physical	13	EA	\$ 1,035\$ 13,455
	(2) Electrical	13	EA	\$ 1,445\$ 18,785
	(3) Dissect	9	EA	\$ 1,670\$ 15,030
	b. MINOR REPAIR as defined in Section C.2 hereof	4	EA	\$ 7,030\$ 28,120
	c. MAJOR REPAIR as defined in Section C.2 hereof	6	EA	\$ 31,390\$ 188,340
	d. REBUILD as defined in Section C.2 hereof	3	EA	\$ 45,755\$ 137,265
	e. Analysis/Inspection for Serviceable/Irreparable Tubes Ref. Clause C.4 hereof	1	EA	\$ 3,315\$ 3,315
2.	X-Ray Shielding for "Serviceable" Klystrons	1	EA	\$ 1,550\$ 1,550

SCHEDULE IV - THIRD OPTION YEAR (Fourth Year)

1.	NSN 5960-00-390-5670, KLYSTRON TUBE: repair/rebuild tubes, Varian Associates, P/N VA-963A or Northrop Grumman P/N 354D362G01				
	a. ANALYSIS OF TUBE: (determine category of repair as defined in Section C.2 hereof)				
	(1) Physical	13	EA	\$ 1,080\$	14,040
	(2) Electrical	13	EA	\$ 1,505\$	19,565
	(3) Dissect	9	EA	\$ 1,740\$	15,660
	b. MINOR REPAIR as defined in Section C.2 hereof	4	EA	\$ 7,315\$	29,260
	c. MAJOR REPAIR as defined in Section C.2 hereof	6	EA	\$ 32,650\$	195,900
	d. REBUILD as defined in Section C.2 hereof	3	EA	\$ 47,585\$	142,755
	e. Analysis/Inspection for Serviceable/Irreparable Tubes Ref. Clause C.4 hereof	1	EA	\$ 3,455\$	3,455
2.	X-Ray Shielding for "Serviceable" Klystrons	1	EA	\$ 1,610\$	1,610

SCHEDULE V - FOURTH OPTION YEAR (Fifth Year)

1.	NSN 5960-00-390-5670, KLYSTRON TUBE: repair/rebuild tubes, Varian Associates, P/N VA-963A or Northrop Grumman P/N 354D362G01				
	a. ANALYSIS OF TUBE: (determine category of repair as defined in Section C.2 hereof)				
	(1) Physical	13	EA	\$ 1,125\$	14,625
	(2) Electrical	13	EA	\$ 1,570\$	20,410
	(3) Dissect	9	EA	\$ 1,810\$	16,290
	b. MINOR REPAIR as defined in Section C.2 hereof	4	EA	\$ 7,610\$	30,440
	c. MAJOR REPAIR as defined in Section C.2 hereof	6	EA	\$ 33,960\$	203,760
	d. REBUILD as defined in Section C.2 hereof	3	EA	\$ 49,490\$	148,470
	e. Analysis/Inspection for Serviceable/Irreparable Tubes Ref. Clause C.4 hereof	1	EA	\$ 3,600\$	3,600
2.	X-Ray Shielding for "Serviceable" Klystrons	1	EA	\$ 1,675\$	1,675

PART I - SECTION C  
SCOPE OF WORK

C.1 SCOPE OF WORK

The contractor shall furnish all labor, plant, parts, supplies, materials, fixtures, equipment, tools, test equipment, technical data/expertise, and other facilities necessary to accomplish the overhaul/repair and return to the Government in a completely serviceable condition, the Government-owned tubes specified in SECTION B, SUPPLIES OR SERVICES AND PRICES/COST. Repairs will be made in accordance with the original manufacturer's specifications; VA-963A Klystron Drawing 354D362, revised December 10, 1999; ANSI/ASQC Q9002-1994; ANSI/ASQ1.4-1993; and FAA-STD-1293c, Servicing Standards and Test Requirements for Ground Electronic Equipment, for performance in the Air Route Surveillance Radar Model 3 (ARSR-3).

C.2 CATEGORY OF REPAIR

(a) The contractor shall analyze each item furnished for repair to determine the category of repair required and shall be paid for that category of analysis required under Item 1.a.(1) Physical; 1.a.(2) Electrical; 1.a.(3) Dissect; of PART I - SECTION B.

(b) Categories of repair are defined as follows:

(1) MINOR REPAIR: A repair that does not require any operation that destroys the vacuum of the tube.

(2) MAJOR REPAIR: A repair that requires the destruction and/or the restoration of the vacuum integrity of the tube. A major repair does not include repair/replacement of the tube body. A tube body is defined as the "RF interaction section or structure."

(3) REBUILD TUBE: A tube that is beyond the major repair category to the extent that the tube is to be totally rebuilt or reconstituted. Rebuilds include repair/replacement of portions of the tube body as well as use made of any portion of the tube judged to be reusable.

(c) Upon completion of the tube analysis, the contractor shall submit the results to the Contracting Officer. The contractor shall not proceed with repair until authorized by the Contracting Officer. After contractor's receipt of notification from Contracting Officer of repair category and notice to proceed, delivery schedule shall be as specified in clause F.2, DELIVERY SCHEDULE (REPAIR OF UNITS). The contractor shall be paid for that category of repair authorized and accomplished (under Item 1.b, Minor Repair; Item 1.c, Major Repair; or Item 1.d, Rebuild) in addition to the cost of analysis.

C.3 DISPOSITION OF UNSALVAGEABLE PARTS

Each component part and material removed from any FAA-owned tube that is determined to be unsalvageable by the contractor shall become property of the contractor.

C.4 SERVICEABLE AND IRREPARABLE ITEMS (JAN 1997)

CLA.1202

(a) In the event the contractor receives Government-owned units which are considered to be either (1) serviceable as received or (2) irreparable, he shall furnish a detailed recommendation to the Contracting Officer within 15 calendar days after receipt of the unit(s). The Contracting Officer will make a determination as to the condition of the unit(s) based upon data furnished by the contractor and/or a physical inspection of the unit(s) by authorized Government personnel.

(b) The Contracting Officer will furnish disposition instructions for serviceable/irreparable units and the contractor shall be entitled to be paid only the appropriate fee for inspection and/or testing as specified under Part I - Section B.

(c) Failure to agree to the condition of the units shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled Contract Disputes, AMS 3.9.1-1.

C.5 OVERHAUL MANUALS (JAN 1997)

CLA.1316

The contractor shall possess, or obtain at its own expense, all applicable manufacturer's manuals and other technical data, except for FAA-published technical data, which will be furnished by the Government at no cost.

C.6 DEFINITIONS (JAN 1997)

CLA.1517

The following definitions apply to this contract:

(a) Reparable - Means the condition of an item which can be returned to service after overhaul, repair, or rework in accordance with procedures, tolerances, and limits established by the overhaul/repair/service specifications and instructions issued by the item manufacturer.

(b) Irreparable - Means the condition of an item which is beyond the overhaul/repair/service limits specified in the specifications and instructions issued by the item manufacturer.

(c) Serviceable - Means the condition of an item in a good state of preservation that can be placed in service for its intended use in accordance with the specifications and instructions issued by the item manufacturer.

PART I - SECTION D  
PACKAGING AND MARKING

D.1 PRESERVATION, PACKAGING, PACKING AND MARKING (JUL 1997)

CLA.2102

(a) All items unless otherwise specified shall be individually packaged to American Society for Testing and Materials (ASTM) D 3951 (packaging). Performance testing of packaging will be IAW ASTM D 4169 assurance level II distribution cycle 18.

(b) All items shall be marked IAW Mil STD 129 "Marking for Shipment and Storage". Bar coding is required, 128 symbology is preferred; however, 3 of 9 will be accepted.

(c) Common hardware items shall be packaged in multiple unit pack quantities compatible with the unit of issue (UI) or Quantity per unit pack (QUP). BULK QUANTITIES ARE NOT ACCEPTABLE.

(d) The following paragraph concerns only Federal Aviation Administration (FAA) items that are shipped to a contractor for repair:

The FAA will endeavor to ship all items in reusable containers. All items shall be returned to the FAA in the same or equal (see A. above) containers. In those instances where material is shipped in specialized containers (plastic/fiberglass shipping cases, metal crates, etc.), that material will be returned in the original container. If an FAA-owned container is not reusable, the contractor shall notify the Contracting Officer, offer to furnish a new comparable

container, and state its price. At its option, the FAA may accept the contractor's offer, or independently furnish a suitable shipment container.

Copies of the ASTMs can be attained from:

ASTM

100 Barr Harbor Dr.

West Conshohocken, PA 19428

(610) 832-9500

Copies of Mil STD 129 can be attained from:

DODSSP

Customer Service

Standardization Documents Order Desk

700 Robbins Avenue Building 4D

Philadelphia, PA 19111-5094

#### PART I - SECTION E INSPECTION AND ACCEPTANCE

##### E.1 QUALITY STANDARDS

A certified ANSI/ASQC/ISO 9000 Quality System must exist. Applicable IPC workmanship standards shall be followed. Product will be inspected and accepted/rejected at destination by the FAA for Technical Specifications and Packaging Specifications as stated in the contract. Certificates of Compliance shall be supplied where applicable.

##### E.2 INSPECTION AND ACCEPTANCE (JAN 1997)

CLA.1906

(a) The Government reserves the right to have its authorized representative inspect the material at the contractor's plant prior to shipment. To facilitate such inspection, the contractor shall give the Contracting Officer a written or telegraphic notice at least 15 working days prior to readiness for inspection. Such notice shall include FAA delivery order number, FAA contract number, and date of proposed inspection. The offeror shall indicate in the following space the location of the plant where the material will be available for inspection.

Plant CPI MPP Division, Bldg. 2

Location 811 Hansen Way, Palo Alto, CA 94303

(b) The Government may waive inspection at contractor's plant. In such event, final inspection will be at destination.

(c) In the event the Government does choose to inspect at the contractor's plant, final inspection at destination shall be ONLY for damage in transit, quantity, item substitution, and visual defects.

(d) Final acceptance will be at destination.

(e) The provisions of this clause shall in no way be construed to limit the rights of the Government under the clause entitled "Inspection of Services -- Fixed-Price and Cost Reimbursement (AMS.3.10.4-4)"

## 3.1-1 Clauses and Provisions Incorporated by Reference (June 1999)

This screening information request (SIR) or contract, as applicable, incorporates by reference one or more provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at: <http://fast.faa.gov> (on this web page, select "toolsets", then "procurement toolbox").

3.10.4-2 Inspection of Supplies--Fixed-Price (April 1996)

3.10.4-4 Inspection of Services--Both Fixed-Price & Cost Reimbursement (April 1996)

3.10.4-16 Responsibility for Supplies (April 1996)

PART I - SECTION F  
DELIVERIES OR PERFORMANCE

## F.1 DELIVERY SCHEDULE (ANALYSIS OF UNITS)

(a) The contractor shall have 10 days to analyze priority 1, 15 days to analyze priority 2, and 45 days for routine requirements beginning on the date of contractor's receipt of FAA delivery order and the associated reparable unit(s), whichever is later, to determine the category of repair. (See clause C.2, Category of Repair).

(b) The contractor shall not proceed with repair until authorized by Contracting Officer. Repaired tubes shall be delivered in accordance with delivery schedule as identified at F.2, Delivery Schedule (REPAIR OF UNITS).

(c) It is assumed that unit(s) for repair shipped under this contract will be received by the contractor in at least 3 calendar days for priority repairs and 30 calendar days for routine repairs after issuance by the FAA. Accordingly, the delivery time for delivery orders issued hereunder will be increased to reflect the assumed transmission time.

## F.2 DELIVERY SCHEDULE (REPAIR OF UNITS)

(a) The Government desires delivery of unit(s) input for service under this contract within the number of calendar days stated below beginning on the date of contractor's receipt of notification by Contracting Officer of repair category and notice to proceed with repairs.

	Estimated Delivery Order Quantity	Delivery Time	
		Desired	Proposed
	(1)	(2)	(3)
Delivery Orders identified as PRIORITY			
1.b. Minor Repair	3 Units	every 10 days	every <u>10</u> days
1.c. Major Repair	3 Units	every 20 days	every <u>30</u> days
1.d. Rebuild	3 Units	every 30 days	every <u>120</u> days

Delivery Orders  
identified as ROUTINE

1.b. Minor Repair	4 Units	every 60 days	every <u>60</u> days
1.c. Major Repair	6 Units	every 90 days	every <u>90</u> days
1.d. Rebuild	3 Units	every 120 days	every <u>120</u> days

(b) If the offeror is unable to meet the DESIRED delivery schedule set forth in column (2) above, he may enter in column (3) the delivery schedule he is prepared to meet. Should the Government determine such proposed delivery schedule to be unacceptable, the Government reserves the right to award to an offeror submitting other than the lowest offer as to price, if such action will provide an acceptable delivery and is determined to be in the best interest of the Government.

(c) The delivery order quantities in column (1) are estimated. The contractor shall be required to deliver the specified number of units listed in each Delivery Order up to the maximum quantity shown under column (1) within the specified number of days under the above column entitled "Delivery Time".

F.3 AUTHORIZED PERFORMANCE (JAN 1997)

CLA.0168

The execution of a contract shall not constitute authority for the contractor to commence performance. Performance shall be ordered by the issuance of a formal delivery order by an authorized Contracting Officer of the Mike Monroney Aeronautical Center. Orders issued orally or by written telecommunications shall reference a formal delivery order number and shall be confirmed by issuance of the formal delivery order.

F.4 CHANGE TO INDIVIDUAL DELIVERY ORDER  
SCHEDULE (JAN 1997)

CLA.1137

(a) The delivery schedule(s) of all delivery orders issued hereunder shall be established in accordance with the terms of the contract.

(b) In the event that the Contractor fails to deliver in accordance with the established delivery schedule(s) and if such failure is not due to an excusable delay as defined in the Default clause of this contract, the Government and the Contractor may at the Government's option, negotiate a revised delivery schedule(s) in exchange for adequate consideration to the Government. A contract modification will not be required, but the delivery order(s) shall be amended in writing accordingly.

(c) A delivery order change or amendment made pursuant to this clause shall not affect the delivery schedule(s) of any other delivery order(s) issued under this contract.

(d) This clause shall not limit the Government's rights under the Default clause.

F.6 CONTRACT PERIOD (JAN 1997)

CLA.1604

The effective period of this contract is one year from date of award.

F.7 ACCELERATED DELIVERY (JAN 1997)

CLA.1817

Any Schedule for delivery or performance may be expedited at the contractor's option, if without additional expense to the Government.

F.8 F.O.B. POINT (REPAIR) (JAN 1997)

CLA.2007

(a) The FAA will pay transportation costs for shipment of reparable units to the contractor's plant. Reparable units will be shipped from Oklahoma City, Oklahoma, or directly from FAA field activities to the contractor's plant.

(NOTE: All outgoing shipments will be classified in accordance with the governing tariff and classification guides of the carrier selected).

(b) The FAA may ship reparable units to the contractor by air transportation and require the contractor to return items by prepaid air transportation. In such event, the contractor may collect any difference between air and surface transportation by entering it as a separate invoice item.

(c) The contractor shall, within 5 days after receipt of reparable units shipped by the FAA under this contract, return one (1) copy of the shipping document to the Contracting Officer, indicating thereon receipt of items and date received.

(d) During performance of this contract if the contractor uses a "ship to" address other than that which has been used by the FAA as a basis for the evaluation of offers, any increase of transportation costs shall be borne by the contractor and any savings shall revert to the FAA.

(e) Return shipment shall be F.O.B., FAA Mike Monroney Aeronautical Center, 6500 South MacArthur Boulevard, Oklahoma City, OK 73169 (Mail: P.O. Box 25082, Oklahoma City, OK 73125). Diverted shipments shall be accomplished in accordance with the clause entitled "Diversion of Shipment Under F.O.B. Destination Contracts."

F.8 DIVERSION OF SHIPMENT UNDER F.O.B. DESTINATION  
CONTRACTS (JUL 1997)

CLA.1259

(a) When a place of delivery is changed in accordance with the Changes clause of this contract, the contract price shall be adjusted pursuant to that clause for any resulting increase or decrease in the cost of performance. No adjustment shall be made for changes in transportation costs when supplies are identically priced for delivery regionally or nationally and the place of delivery is changed within the area to which the identical price applies. In all other cases, price adjustments due to changes in transportation costs shall be determined by comparing the cost of--

(1) Shipments to the new destinations as evidenced by copy of paid freight bills to be supplied by the Contractor with the invoice; and

(2) Shipments to the original or old destination as evidenced by copy of the appropriate paid freight bills to be supplied by the Contractor, or, in the event no shipments were made, as evidenced by the applicable rates of a common or contract carrier. If carrier rates are not publicly filed with any regulatory body, (e.g., interstate shipments moving by rail piggyback service) the Contractor shall provide a copy of the contract, letter agreement or other written communication from carriers quoting the rates/changes that would have been applied for shipments to the original or old destination.

(b) If (1) shipments to the new destination are made by the Contractor's owned or leased trucks and/or (2) shipments to the original destination were made or would have been made by the Contractor's owned or leased trucks, the Contractor shall so certify. The Government shall make an appropriate adjustment in contract prices for payment purposes by substituting a rate equal to 70 percent of the lowest applicable rate published in common carrier tariffs as of the date of shipment for the Contractor's actual rate or contemplated transportation costs.

(c) If any or all of the following data are not clearly shown on, or available from, copies of paid freight bills for each diverted shipment, the Contractor shall supply a statement showing the--

- (1) Full name of the carrier or carriers in the routing;
- (2) Number of containers;
- (3) Gross shipping weight;
- (4) Actual date of shipment; and
- (5) Freight description for the supplies as indicated in the "National Motor Freight Classification" or the "Uniform Freight Classification" (Rail).

### 3.1-1 Clauses and Provisions Incorporated by Reference (June 1999)

This screening information request (SIR) or contract, as applicable, incorporates by reference one or more provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at: <http://fast.faa.gov> (on this web page, select "toolsets", then "procurement toolbox").

- 3.10.1-9 Stop-Work Order (October 1996)
- 3.10.1-11 Government Delay of Work (April 1996)
- 3.11-34 F.O.B. Destination (April 1999)

## PART I - SECTION G CONTRACT ADMINISTRATION DATA

### G.1 CONTACTS AND SHIPPING POINTS

(a) The contractor will identify specific personnel by name and telephone number who can be contacted regarding repair requirements during both normal and other than normal duty hours. This information will be provided by the contractor within 14 calendar days after date of contract award.

- (b) The contractor will identify the address for items shipped as follows:
- (1) Address for all items shipped via UPS or other freight lines.
  - (2) Address for all items shipped via Parcel Post or Air Mail.

(c) Units will be shipped to the contractor from either the FAALC or direct from field facilities. Upon completion of repair, the items will be returned either to the Federal Aviation Administration Logistic Center (FAALC) or directly to field facilities, according to instructions provided by the FAALC Contracting Officers Representative (COR).

### G.2 OPTION TO EXTEND SERVICES (JAN 1997)

CLA.0116

The Government may unilaterally exercise its option to extend the term of the contract for performance of specified services pursuant to AMS Clause 3.2.4-34, Option to Extend Services, by written notice to the contractor not later than the expiration date of the current contract period.

### G.3 PAYMENT (REPAIR) (JUL 1997)

CLA.2906

(a) The contractor shall submit a separate invoice on each delivery order as follows:

(1) The original to: FAA, Mike Monroney Aeronautical Center  
Financial Operations Division (AMZ-100)  
P.O. Box 25710  
Oklahoma City, OK 73125-4913

(2) Two copies to: FAA, Mike Monroney Aeronautical Center  
NAS, Automation, & Facilities  
Contract Mgmt. (AMQ-240)  
P.O. Box 25082  
Oklahoma City, OK 73125

(b) Each invoice shall contain the following information:

- (1) Delivery order number.
- (2) Contract number.
- (3) Noun description of supplies or services.
- (4) National stock number and serial number of item repaired.
- (5) Quantities.
- (6) Extended totals.

(c) For any item rejected on a delivery order, the contractor is required to resubmit their revised invoice when the unit has been repaired and returned to the FAA.

(d) Invoices on rejected items will not be considered unless resubmitted.

#### PART I - SECTION H SPECIAL CONTRACT REQUIREMENTS

##### H.1 PRIORITY REPAIRS

Delivery orders will be designated either PRIORITY or ROUTINE. A copy of the Contracting Officer's priority repair authorization (the applicable delivery order) shall accompany each invoice submitted for completed Priority Repair actions.

##### H.2 AGREEMENT TO PARTICIPATE IN ALTERNATIVE DISPUTE RESOLUTION (APRIL 1998)

CLA.4540

(a) The Federal Aviation Administration encourages direct communications and negotiations between the contractor and the contracting officer in an attempt to resolve contract disputes. In those situations where the parties are not able to achieve resolution at the contracting officer level, the agency favors the use of alternative dispute resolution (ADR) techniques to resolve disputes.

(b) The parties hereby agree that, prior to referring a contract dispute to the Office of Disputes Resolution as described in contract clause 3.9.1-1 "Contract Disputes", the parties will discuss whether they are willing to utilize ADR techniques such as mediation or nonbinding evaluation of the dispute by a neutral party. Upon receipt of a contract dispute from the contractor, the contracting officer will explore with the contractor whether the use of ADR techniques would be appropriate to resolve the dispute. Both parties must agree that the use of such techniques is appropriate, and agree to fairly share the associated expenses. If the parties do not mutually agree to utilize ADR to resolve the dispute, the dispute will be processed in accordance with the procedures set forth in clause 3.9.1-1.

PART II - SECTION I  
CONTRACT CLAUSES

3.2.4-16 Ordering (October 1996)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued during the effective period of the contract stated in the Schedule.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

3.2.4-17 Order Limitations (October 1996)

(a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than \$50, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

(b) Maximum order. The Contractor is not obligated to honor-

(1) Any order for a single item in excess of estimated annual quantity;

(2) Any order for a combination of items in excess of the estimated annual quantity; or

(3) A series of orders from the same ordering office within 30 days that together call for quantities exceeding the limitation in subparagraph (1) or (2) above.

(c) If this is a requirements contract, the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 15 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

3.2.4-19 Requirements (October 1996)

(a) This is a requirements contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies or services specified in the "Schedule" are estimates only and are not purchased by this contract. Except as this contract may otherwise provide, if the Government's requirements do not result in orders in the quantities described as "estimated" or "maximum" in the Schedule, that fact shall not constitute the basis for an equitable price adjustment.

(b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. Subject to any limitations in the Order Limitations clause or elsewhere in this contract, the Contractor shall furnish to the Government all supplies or services specified in the "Schedule" and called for by orders issued in accordance with the Ordering clause. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(c) Except as this contract otherwise provides, the Government shall order from the Contractor all the supplies or services specified in the "Schedule" that are required to be purchased by the Government activity or activities specified in the "Schedule."

(d) The Government is not required to purchase from the Contractor requirements in excess of any limit on total orders under this contract.

(e) If the Government urgently requires delivery of any quantity of an item before the earliest date that delivery may be specified under this contract, and if the Contractor will not accept an order providing for the accelerated delivery, the Government may acquire the urgently required goods or services from another source.

(f) Any order issued during the effective period of this contract and not completed within that period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after the delivery date required by order(s) placed within the ordering period.

#### 3.2.4-19/alt1 Requirements Alternate I (October 1996)

If the requirements contract is for nonpersonal services and related supplies and covers estimated requirements that exceed a specific Government activity's internal capability to produce or perform, substitute the following paragraph (c) for paragraph (c) of the basic clause:

(c) The estimated quantities are not the total requirements of the Government activity specified in the Schedule, but are estimates of requirements in excess of the quantities that the activity may itself furnish within its own capabilities. Except as this contract otherwise provides, the Government shall order from the Contractor all of that activity's requirements for supplies and services specified in the "Schedule" that exceed the quantities that the activity may itself furnish within its own capabilities.

#### 3.2.4-34 Option to Extend Services (April 1996)

The Government may require continued performance of any services within the limits and at the rates specified in the contract. These rates may be adjusted only as a result of revisions to prevailing labor rates provided by the Secretary of Labor. The option provision may be exercised more than once, but the total extension of performance hereunder shall not exceed 6 months. The Contracting Officer may exercise the option by written notice to the Contractor within the period specified in the Schedule.

#### 3.2.4-35 Option to Extend the Term of the Contract (April 1996) (R)

(a) The Government may extend the term of this contract by written notice to the Contractor within the present term of the contract; provided, that the Government will give the Contractor a preliminary written notice of its intent to extend at least 60 days before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option provision.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed five years.

### 3.3.1-11 Availability of Funds for the Next Fiscal Year (April 1996)

Funds are not presently available for performance under this contract beyond September 30, 2000. The FAA's obligation for performance of this contract beyond that date is contingent upon the availability of appropriated funds from which payment for contract purposes can be made. No legal liability on the part of the FAA for any payment may arise for performance under this contract beyond September 30, 2000, until funds are made available to the Contracting Officer for performance and until the Contractor receives notice of availability, to be confirmed in writing by the Contracting Officer.

### 3.9.1-1 Contract Disputes (August 1999)

(a) All contract disputes arising under or related to this contract shall be resolved through the Federal Aviation Administration (FAA) dispute resolution system at the Office of Dispute Resolution for Acquisition (ODRA) and shall be governed by the procedures set forth in 14 C.F.R. Parts 14 and 17, which are hereby incorporated by reference. Judicial review, where available, will be in accordance with 49 U.S.C. 46110 and shall apply only to final agency decisions. A contractor may seek review of a final FAA decision only after its administrative remedies have been exhausted.

(b) The filing of a contract dispute with the ODRA may be accomplished by mail, overnight delivery, hand delivery, or by facsimile. A contract dispute is considered to be filed on the date it is received by the ODRA.

(c) Contract disputes are to be in writing and shall contain:

(1) The contractor's name, address, telephone and fax numbers and the name, address, telephone and fax numbers of the contractor's legal representative(s) (if any) for the contract dispute;

(2) The contract number and the name of the Contracting Officer;

(3) A detailed chronological statement of the facts and of the legal grounds for the contractor's positions regarding each element or count of the contract dispute (i.e., broken down by individual claim item), citing to relevant contract provisions and documents and attaching copies of those provisions and documents;

(4) All information establishing that the contract dispute was timely filed;

(5) A request for a specific remedy, and if a monetary remedy is requested, a sum certain must be specified and pertinent cost information and documentation (e.g., invoices and cancelled checks) attached, broken down by individual claim item and summarized; and

(6) The signature of a duly authorized representative of the initiating party.

(d) Contract disputes shall be filed at the following address:

(1) Office of Dispute Resolution for Acquisition, AGC-70, Federal Aviation Administration, 400 7th Street, S.W., Room 8332, Washington, DC 20590, Telephone: (202) 366-6400, Facsimile: (202) 366-7400; or

(2) other address as specified in 14 CFR Part 17.

(e) A contract dispute against the FAA shall be filed with the ODRA within two (2) years of the accrual of the contract claim involved. A contract dispute by the FAA against a contractor (excluding contract disputes alleging warranty issues, fraud or latent defects) likewise shall be filed within two (2) years after the accrual of the contract claim. If an underlying contract entered into prior to the effective date of this part provides for time limitations for filing of contract disputes with the ODRA which differ from the aforesaid two (2) year period, the limitation periods in the contract shall control over the limitation period of this section. In no event will either party be permitted to file with the ODRA a contract dispute seeking an equitable adjustment or other damages after the

contractor has accepted final contract payment, with the exception of FAA claims related to warranty issues, gross mistakes amounting to fraud or latent defects. FAA claims against the contractor based on warranty issues must be filed within the time specified under applicable contract warranty provisions. Any FAA claims against the contractor based on gross mistakes amounting to fraud or latent defects shall be filed with the ODRA within two (2) years of the date on which the FAA knew or should have known of the presence of the fraud or latent defect.

(f) A party shall serve a copy of the contract dispute upon the other party, by means reasonably calculated to be received on the same day as the filing is to be received by the ODRA.

(g) After filing the contract dispute, the contractor should seek informal resolution with the Contracting Officer.

(h) The FAA requires continued performance with respect to contract disputes arising under this contract, in accordance with the provisions of the contract, pending a final FAA decision.

(i) The FAA will pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the contract dispute, or (2) the date payment otherwise would be due, if that date is later, until the date of payment. Simple interest on contract disputes shall be paid at the rate fixed by the Secretary of the Treasury that is applicable on the date the Contracting Officer receives the contract dispute and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary until payment is made.

(j) Additional information and guidance about the ODRA dispute resolution process for contract disputes can be found on the ODRA Website at <http://www.faa.gov>.

### 3.9.1-2 Protest After Award (August 1997)

(a) Upon receipt of a notice that a protest has been filed with the FAA Office of Dispute Resolution, or a determination that a protest is likely, the Administrator or his designee may instruct the Contracting Officer to direct the Contractor to stop performance of the work called for by this contract. The order to the Contractor shall be in writing, and shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision or other resolution of the protest, the Contracting Officer shall either--

- \_(1) Cancel the stop-work order; or
- \_(2) For other than cost-reimbursement contracts, terminate the work covered by the order as provided in the "Default" or the "Termination for Convenience of the Government" clause(s) of this contract; or
- \_(3) For cost-reimbursement contracts, terminate the work covered by the order as provided in the "Termination" clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after the final resolution of the protest, the Contractor shall resume work. The Contracting Officer shall make for other than cost-reimbursement contracts, an equitable adjustment in the delivery schedule or contract price, or both; and for cost-reimbursement contracts, an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract that may be affected; and the contract shall be modified, in writing, accordingly, if--

- \_(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and
- \_(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive

and act upon a proposal submitted at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

### 3.10.2-1 Subcontracts (Fixed-Price Contracts) (April 1996)

(a) This clause does not apply to firm-fixed-price contracts and fixed-price contracts with economic price adjustment. However, it does apply to subcontracts resulting from unpriced modifications to such contracts.

(b) Subcontract, as used in this clause, includes but is not limited to purchase orders, and changes and modifications to purchase orders. The Contractor shall notify the Contracting Officer reasonably in advance of entering into any subcontract if the Contractor does not have an approved purchasing system and if the subcontract:

(1) Is proposed to exceed \$100,000; or

(2) Is one of a number of subcontracts with a single subcontractor, under this contract, for the same or related supplies or services, that in the aggregate are expected to exceed \$100,000.

(c) The advance notification required by paragraph (b) above shall include-

(1) A description of the supplies or services to be subcontracted;

(2) Identification of the type of subcontract to be used;

(3) Identification of the proposed subcontractor and an explanation of why and how the proposed subcontractor was selected, including the competition obtained;

(4) The proposed subcontract price and the Contractor's cost or price analysis;

(5) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions;

(6) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract; and

(7) A negotiation memorandum reflecting-

(i) The principal elements of the subcontract price negotiations;

(ii) The most significant considerations controlling establishment of initial or revised prices;

(iii) The reason cost or pricing data were or were not required;

(iv) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;

(v) The extent, if any, to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and subcontractor; and the effect of any such defective data on the total price negotiated;

(vi) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

(vii) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(d) The Contractor shall obtain the Contracting Officer's written consent before placing any subcontract for which advance notification is required under paragraph (b) above. However, the Contracting Officer may ratify in writing any such subcontract. Ratification shall constitute the consent of the Contracting Officer.

(e) Even if the Contractor's purchasing system has been approved, the Contractor shall obtain the Contracting Officer's written consent before placing subcontracts identified below: All subcontracts in excess of \$500,000.

(f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall constitute a determination (1) of the acceptability of any subcontract terms or conditions, (2) of the acceptability of any subcontract price or of any amount paid under any subcontract, or (3) to relieve the Contractor of any responsibility for performing this contract.

(g) No subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis.

(h) The Government reserves the right to review the Contractor's purchasing system.

### 3.1-1 Clauses and Provisions Incorporated by Reference (June 1999)

This screening information request (SIR) or contract, as applicable, incorporates by reference one or more provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at: <http://fast.faa.gov> (on this web page, select "toolsets", then "procurement toolbox").

#### 3.2.2.3-33 Order of Precedence (January 1999)

#### 3.2.2.7-6 Protecting the Government's Interest when Subcontracting with

Contractors Debarred, Suspended, or Proposed for Debarment (April 1996)

#### 3.2.2.8-1 New Material (October 1996)

#### 3.2.5-1 Officials Not to Benefit (April 1996)

#### 3.2.5-3 Gratuities or Gifts (January 1999)

#### 3.2.5-4 Contingent Fees (October 1996)

#### 3.2.5-5 Anti-Kickback Procedures (October 1996)

#### 3.2.5-8 Whistleblower Protection for Contractor Employees (April 1996)

#### 3.2.5-11 Drug Free Workplace (April 1996)

#### 3.3.1-1 Payments (April 1996)

#### 3.3.1-6 Discount for Prompt Payment (April 1996)

#### 3.3.1-8 Extras (April 1996)

#### 3.3.1-9 Interest (April 1996)

#### 3.3.1-10 Availability of Funds (April 1996)

#### 3.3.1-15 Assignment of Claims (April 1996)

#### 3.3.1-17 Prompt Payment (August 1998)

#### 3.3.1-25 Mandatory Information for Electronic Funds

Transfer Payment (October 1996)

#### 3.4.2-6 Taxes--Contracts Performed in U.S. Possessions or Puerto Rico (October 1996)

#### 3.4.2-8 Federal, State, and Local Taxes--Fixed Price Contract (April 1996)

#### 3.5-1 Authorization and Consent (April 1996)

#### 3.5-2 Notice and Assistance Regarding Patent and Copyright Infringement (April 1996)

#### 3.5-3 Patent Indemnity (April 1996)

#### 3.6.1-3 Utilization of Small, Small Disadvantaged and Women-Owned Small Business Concerns (April 1996)

- 3.6.2-4 Walsh-Healey Public Contracts Act (April 1996)
- 3.6.2-9 Equal Opportunity (August 1998)
- 3.6.2-12 Affirmative Action for Special Disabled and  
Vietnam Era Veterans (January 1998)
- 3.6.2-13 Affirmative Action for Handicapped Workers (April 2000)
- 3.6.2-14 Employment Reports on Special Disabled Veterans and  
Veterans of Vietnam Era (January 1998)
- 3.6.2-33 Exemption from Application of Service Contract Act Provisions (for  
Contracts for Maintenance, Calibration, and/or Repair of Certain ADP, Scientific  
and Medical, and/or Office and Business Equipment-Contractor Certification)  
(April 1996)
- 3.6.3-2 Clean Air and Clean Water (April 1996)
- 3.6.3-11 Toxic Chemical Release Reporting (August 1998)
- 3.6.4-2 Buy American Act--Supplies (July 1996)
- 3.6.4-10 Restrictions on Certain Foreign Purchases (April 1996)
- 3.10.1-7 Bankruptcy (April 1996)
- 3.10.1-12 Changes--Fixed-Price (April 1996)
- 3.10.1-12/alt2 Changes--Fixed-Price Alternate II (April 1996)
- 3.10.1-22 Contracting Officer's Technical Representative (July 1996)
- 3.10.2-6 Subcontracts for commercial Items and Commercial  
Components (April 1996)
- 3.10.6-1 Termination for Convenience of the Government (Fixed Price)  
(October 1996)
- 3.10.6-4 Default (Fixed-Price Supply and Service) (October 1996)
- 3.13-3 Printing/Copying Double-sided on Recycled Paper (April 1996)
- 3.13-8 Foreign Nationals as Contractor Employees (January 2000)

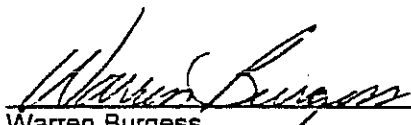
PART III - SECTION J  
LIST OF ATTACHMENTS

<u>ATTACHMENT</u>	<u>TITLE</u>	<u>DATE</u>	<u>NO. OF PAGES</u>
1	FAAD-STD-1293c, Servicing Standards And Test Requirements For Ground Electronic Equipment	02/10/98	12
2	VA-963A Klystron Drawing 354D362, FAA Logistic Center Performance Specification and Acceptance Tests For the FAA "L" Band ARSR-3 Radar Klystron	12/10/99	18

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
ENGINEERING AND PRODUCTION BRANCH  
FAA LOGISTICS CENTER STANDARD

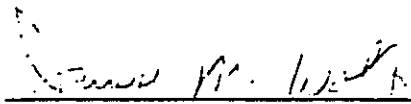
SERVICING STANDARDS AND TEST REQUIREMENTS  
FOR GROUND ELECTRONIC EQUIPMENT

Submitted by:



Warren Burgess  
Program Analyst, AML-460

Approved:



Jerald Wolf  
Engineer, AML-460

Approved:



Cassius Brookshire  
Manager, AML-460

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
ENGINEERING AND PRODUCTION BRANCH  
FAA LOGISTICS CENTER STANDARD

SERVICING STANDARDS AND TEST REQUIREMENTS  
FOR GROUNDED ELECTRONIC EQUIPMENT

1. SCOPE

1.1 Scope:

This standard establishes (as applicable) the acceptable workmanship criteria and test requirements for equipment intended for use by the Federal Aviation Administration facilities.

1.2 Purpose:

To define those workmanship and test requirements not normally covered in subsidiary specifications or drawings. It provides clearly defined statement of work requirements that takes into account the degree of servicing and testing to be accomplished by the contractor in ground equipment repair transactions. It provides the basis for a common ground of understanding between a contractor and the FAA Logistics Center regarding work and testing to be accomplished during Level A servicing. It is not intended to supersede any of the provisions of the contract or applicable specifications and drawings considered a part of the contract. Where actual conflicts exist, the provisions of the contract or applicable specifications or drawings shall take precedence over the requirements herein.

1.3 Definitions

1.3.1 Item:

That which is shipped from the FAA field facility to the FAA Logistics Center for servicing.

1.3.2 Equipment:

A complete set of units in a facility which has the capability of performing all of the prescribed functions of that facility, such as a RADAR system, VOR, or TACAN.

**1.3.3 Unit:**

A complete operating assembly within an equipment, such as a transmitter, receiver, or antenna.

**1.3.4 Component:**

A complete self-contained element or assembly within a unit which performs a specific function necessary to the satisfactory operation of the unit, such as a STALO, meter panel, or antenna pedestal.

**1.3.5 Subassembly:**

A structural element of an item secured by fasteners or other mechanical means, upon which are mounted one or more electronic and/or mechanical parts, in accordance with the following:

<u>Item</u>	<u>Subassembly</u>
Equipment	Unit
Unit	Component
Component	Parts Assembly

**1.3.6 Minimum disassembly:**

Removal or opening of any of the shielding devices of an item such as panels, covers, doors, or lids to permit access to protected electronic and/or mechanical parts.

**1.3.7 Partial Disassembly:**

Removal of one or more but not all of the subassemblies of an item and/or any dismantling necessary to permit access to electronic and/or mechanical parts of the subassembly(ies).

**1.3.8 Complete Disassembly:**

Removal of all of the subassemblies of an item and/or the dismantling necessary to permit access to electronic and/or mechanical parts of an item.

**1.3.9 Servicing Level A:**

Normal servicing level for items with partial disassembly. This level is used to service items not requiring an appearance and performance equivalent to that of a new item except as specified in paragraph 3.3.

**1.3.10 - Part Peculiar:**

Any item (part, subassembly, assembly, unit, etc.) designed, developed, altered, assembled, or fabricated by the contractor or his vendor specifically for use with the particular equipment.

**2. APPLICABLE DOCUMENTS****2.1 FAA Documents:**

The following FAA Documents of the issue in effect on the date of the invitation for bids or request for proposals form a part of this standard and are applicable to the extent specified herein:

AC Form 4680-2	E&R Quality Feedback Tag
FAA Form 6032-1	Airway Facilities Modification Record
FAAD-R-1139c	Printed Circuit Boards
AC Form 6040-51	Failure & Repair History

## 2.2 Other Documents:

The following documents of the issue in effect on the date of the invitation for bids or request for proposals forms a part of this standard and is applicable to the extent specified herein.

ISO 10012-1

International Organization for Standards (ISO),  
Quality Assurance Requirements for Measuring Equip-  
ment, Part 1: "Meteorological Confirmation System for  
Measuring Equipment.

NCSL Z540-1

(ANSI)/National Conference of Standards Laboratories,  
General Requirements for Calibration Laboratories and  
Measuring and Test Equipment.

Note: Single copies of these specifications may be requested by mail from American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036.

## 3. REQUIREMENTS

### 3.1 General Repair Requirements:

The item, including all parts and accessories, shall be serviced in a thoroughly workmanlike manner. Particular attention shall be given to neatness and thoroughness of soldering, marking of parts and assemblies, wiring, welding and brazing, plating, riveting, finishes, machine operations, screw assemblies, and freedom of parts from burrs and sharp edges or any other damage or defect that could make the item unsatisfactory for the operation or function intended. Printed circuit boards (PCBs) shall be repaired in accordance with specification FAAD-R-1139c, except that the replacement coating referred to in 3.3.9 shall be equal to the coating which was removed. The repaired equipment shall perform the function for which it was designed or modified, and meet all the test requirements herein.

### 3.2 Specific Repair Requirements:

The following specific repair requirements shall be accomplished as applicable to individual items.

#### 3.2.1 Repairing:

Trouble-shoot, visually and with the aid of test equipment, and replace obviously defective or questionable parts revealed by a partial disassembly of the item made necessary to correct troubles and/or incorporate authorized modifications.

#### 3.2.2 Cleaning:

Remove all dust, grease, or corrosion from the item, chassis, subassemblies, and parts. Parts shall be cleaned of smudges, loose, spattered, or excess solder, metal chips, or any other foreign material which might detract from the intended operation or function of the equipment. All corrosive materials shall be removed. Whenever possible, this cleaning shall take place before the parts are assembled into the item. Cleaning processes shall have no deleterious effect on the item or parts.

#### 3.2.3 Refinishing:

Sand, prime, and touch up all marred surfaces revealed by a partial disassembly, closely matching the original color. Touch up silk screening, engraving, diagrams, circuit symbol designations, etc., to a readable condition.

**3.2.4 Electroplating:**

Apply plating finishes to parts surfaces or contacts revealed by partial disassembly only as necessary to stop pitting or corrosion of base metal and to meet the item performance requirements.

**3.2.5 Modifying:**

Incorporate all standard approved modifications. Remove all nonstandard modifications revealed by partial disassembly. FAA Form 6032-1, Airway Facilities Modification Record, (to be provided by the government) shall be used to document the installation and the removal of all modifications to the FAA equipment. If a field-prepared FAA Form 6032-1 is returned with the repaired item the form shall be attached to the AC Form 4680-2 (see 3.2.22) on each equipment by the contractor. The following information shall be entered on the form:

<u>Heading</u>	<u>Information</u>
DESCRIPTION OF ITEM	Equipment manufacturer's name and part number
SERIAL NUMBER	Serial number of equipment
FAA TYPE DESIGNATION	FAA type number when assigned
CODE	The letter "N"
TITLE OR DESCRIPTION	The notation "N/A"

Note: Parts peculiar, required for installation of modifications, will be furnished by the FAA Logistics Center when specified in the contract.

**3.2.6 Mounting of Parts:**

Parts, components, or hardware, etc. shall be assembled and secured or mounted in a manner equal to the item's original manufacture. Items having missing, inoperative, defective, bent, broken, or otherwise damaged parts will not be acceptable.

**3.2.7 Mounted Hardware Installation:**

The installation of hardware parts, such as hinges, catches, handles, knobs, etc., shall be accomplished in such a manner as to avoid damaging the hardware or the mounting surface.

**3.2.8 Threaded Parts or Devices:**

Screws, nuts, bolts, etc., shall show no evidence of cross-threading, detrimental or hazardous burrs, or mutilation.

**3.2.9 Tightness:**

All screw or bolt-type fasteners shall be tight. "Tight" means that the screw or bolt shall be firmly secured and that there shall be no relative movement possible between the attached parts.

**3.2.10 Riveting:**

The riveting operation shall be carefully performed in order to assure that rivets are tight and satisfactorily headed with the rivet heads tightly seated against their bearing surface.

**3.2.11 Gear Assemblies:**

Gear assemblies shall be properly aligned and meshed and shall be operable without interference, tight or loose parts, excessive backlash, or other irregularities that could cause unsatisfactory operation.

**3.2.12 Bearing Assemblies:**

Bearing assemblies shall be free of rust, discoloration, and imperfections of ground, honed, or lapped surfaces. Particular attention shall be given to contacting surfaces which shall be free

of tool marks, gouges, nicks, or other surface-type defects. There shall be no detrimental interference, binding, or galling.

### 3.2.13 Wiring and Cabling:

Wiring and cabling shall be neat and sturdy. Insulated wire running between equipment or subassemblies within an equipment, such as between drawers or chassis and module subassemblies, shall be formed into cables or ducted wherever practicable. Wires and cables shall be positioned or protected to avoid contact with rough or irregular surfaces and sharp edges.

#### 3.2.13.1 Wire Dress or Cabling:

Wire dress or cabling shall not result in improper electrical operation or interference with mechanical operation that will lead to subsequent damage of the wire or cable.

#### 3.2.13.2 Lacing of Cable:

Lacing of cable shall be neat in appearance. The lacing shall be applied firmly, yet not with excessive pressure which would cut into a conductor's insulation.

#### 3.2.13.3 Cabling or Wiring Harness:

Cabling or wiring harnesses shall be properly anchored to avoid damage to conductors or to parts adjacent to the cable harness.

### 3.2.14 Insulation:

Remove and replace all wires where insulation shows evidence of burns, abrasion, pinch marks or deterioration that could cause short circuits or leakage.

### 3.2.15 Splicing:

Wires in continuous runs between two terminals shall not be spliced during the assembly of the equipment except where a stranded conductor is spliced to solid conductor and the two are supported at the splice. Coaxial cable and twisted pair with shield shall not be spliced between assemblies or subassemblies.

### 3.2.16 Clearance:

The clearance between wires or cables and heat generating parts, such as electron tubes, resistors, etc., shall be such as to avoid deterioration of the wires or cables from the heat dissipated by these parts under the specified service conditions of the equipment.

### 3.2.17 Shielding:

Shielding on wires and cables shall be secured in a manner which will prevent it from contacting or shorting exposed current-carrying parts. The shielding shall terminate at a sufficient distance from the exposed conductors of the cable to prevent shorting or arcing between the cable conductor and the shielding. The ends of the shielding or braid shall be secured against fraying.

### 3.2.18 Welding:

The joining surfaces of all parts to be welded shall be cleaned of all foreign matter such as rust, scale, paint, and grease. All welds shall be free of harmful defects such as cracks, porosity, undercuts, voids and gaps.

#### 3.2.18.1 Quality:

There shall be no burn-through or incomplete penetration of filler metal in the joint. Fillets shall be uniform and smooth. Fusion shall be complete and adequate.

**3.2.18.2 Alignment:**

There shall be no excessive angular or thickness misalignment, warping, or dimensional change due to heat from the welding operation.

**3.2.18.3 Spot Welding:**

Spot welding shall be adequate to provide the required strength.

**3.2.19 Soldering:**

No cold solder joints will be permitted. All solder connections shall be neat and in accordance with the highest degree of good electronic work. Solder connections which are not neat in appearance, have incorrect connections, or have excess solder on the terminal, shall be reworked.

**3.2.19.1 Soldered Connections:**

All wire connected to solder-type terminals shall be fastened by crimping the wires on the terminals prior to soldering so that the solder is not depended on for mechanical strength. This requirement shall not apply to cup-type terminals, such as are found on AN-type cable connectors, nor to other specialized soldered joints, such as are used in assembling coaxial connectors, where crimping is unsuitable. Solderless type wire lugs shall be crimped on the wire using a tool and method approved by the lug manufacturer.

**3.2.19.2 Extension Pigtails on Wire-Mounted Components:**

The wire leads of resistors, capacitors, and similar components mounted on insulating terminals shall extend out from the soldering terminals sufficiently to allow the leads to be gripped by long-nose pliers, except where not practicable. In order to assure that leads and wires are mechanically secured to their terminals before soldering, the leads shall be wound around the terminals 1 1/2 turns, except that as little as one turn may be used where 1 1/2 turns are not practicable. All pigtails shall be cut off evenly and shall present a neat appearance.

**3.2.20 Replacement Parts:**

Replacement parts shall be as specified in the equipment instruction book parts list or a part approved by the equipment manufacturer. When the foregoing described parts are not readily available or they are uneconomical to obtain, another part may be used provided it has equal or better electrical and mechanical properties and is physically interchangeable with the parts list part. When an interchangeable part is not readily available or it is uneconomical to obtain, the contractor shall select a substitute part suitable for the intended use and request approval to use the part from the FAA representative or contracting officer.

**3.2.21 Adjusting and Calibrating:**

Make the mechanical and electronic adjustments and calibrations required by current specifications or other authorized documentation for item tune-up or alignment.

**3.2.22 AC Form 4680-2:**

This form shall be completed and attached to each repaired equipment by the contractor prior to delivering the item to the FAA. The following information shall be entered on the form:

<u>Heading</u>	<u>Information</u>
FSN (or NSN)	Equipment National Supply Number (NSN) which appears in the contract.
NOUN	Equipment manufacturer's name and part number.
DATE	The date the equipment repair was completed.

SERIAL NUMBER	The equipment's serial number.
REPAIRED BY	The Contractor's Name.
CONTRACT or P.O. NUMBER	The contract number if assigned, otherwise, purchase order number.

**3.2.23 AC Form 6040-51:**

Upon completion of the repair of an item the contractor shall fill out the failure and repair history form, AC 6040-51, and return it to the contracting officer. The form shall be mailed to the FAA at the same time the repaired item is delivered to the FAA. The following is a narrative of the blocks on the form:

**CONTROL NUMBER:**

This is the purchase order number of the work as assigned by FAA contracting.

**SERIAL NUMBER:**

This is the unique serial number of the repaired line replaceable unit (LRU). If the number is present on the LRU it should be entered on the form. Should a number not be present on the LRU one will be furnished by the government. To receive a serial number call AML-410, Planning and Scheduling Branch, at (405) 954-5271 from 9:00 a.m. to 3:00 p.m. CST, Monday through Friday. Have the purchase order number and the NSN of the item ready and a number will be generated for the LRU. Once the serial number is received it should be transferred to the LRU using an indelible ink marker or any other type of suitable method which will stay permanently on the LRU.

**NSN (National Stock Number):**

This is a unique thirteen (13) digit number assigned to an item in the Department of Defense System.

**P/N (Part Number):**

This is the manufacturer's part number for the item.

**CAGE (Commercial and Government Entity):**

This code is a five (5) character code representing a particular manufacturer. This code was previously referred to as the federal supply code. Should the CAGE not be present on the purchase order or LRU it will be provided by the government. To receive the CAGE ask the FAA representative or contracting officer for information on how to obtain it.

**SHIP FROM SSC (Supply Support Code):**

The ship from supply support code of the facility having the item repaired. This information is on form FAA 4250-5 and is with the item when delivered.

**FAIL CODE:**

The failure code is a two (2) character code that relates to a specific failure description.

**FAIL IND:**

The failed item identifier indicates that the failed item is any of the following: a circuit symbol (C), a part number (P), or a noun (N). This prevents confusing circuit assemblies and some piece parts which have the same number. It is suggested the part number (P) designator be used in most cases to reduce research time for the next occurrence of this problem.

**FAILED ITEM:**

This is the actual part number, circuit symbol, and name of the items which have failed.

**REPAIR CODE:**

This is a two (2) character code which identifies a specific repair action.

**REPAIR IND:**

The repair item identifier indicates that the repair item is any of the following: ac circuit symbol (C), a part number (P), or a noun (N). This prevents confusing circuit assemblies and some piece parts which have the same number. It is suggested the part number (P) designator be used in most cases to reduce the research time for the next occurrence of this problem.

**REPAIRED ITEM:**

This is the actual part number, circuit symbol, or name of the item which has been repaired.

**REMARKS:**

This is a section for free-form text that can be used for additional repair cycle information.

**3.3 Test Methods:**

The contractor shall prepare the necessary list of tests, acceptance test procedures, and test data forms. Test procedures shall be complete and in sufficient detail to permit evaluation of their adequacy in demonstrating compliance with performance requirements as specified in the contract without recourse to physical examination of the test facility. Test procedures shall include block diagrams of the test setup identifying all connection points, test points, and controls. Supplementary descriptive information shall be furnished on any special test equipment or fixtures utilized in the test and shall include drawings, theory of operation, and analysis of measurement accuracy as appropriate. The test procedure and data forms shall provide for the recording of all observed data and all intermediate steps or mathematical calculations which may be involved in determination of the final measurement. All data shall be quantitative and each final entry shall be in units directly comparable to the specification limits.

**3.3.1 Approval of Test Methods:**

Four copies of the proposed list of tests, test procedures, and blank test data forms shall be furnished to the government as follows: Three (3) copies to the contracting officer or his designated technical representative, and one (1) copy to the resident FAA quality assurance representative, if assigned, otherwise the copy should be forwarded to the FAA contracting officer or his designated technical representative. Copies shall be furnished at least twenty (20) days in advance of the contractor's scheduled date for testing to allow the government time to review and evaluate. One (1) copy will be returned to the contractor, either with a statement that the proposed methods and forms are approved by the government for use by the quality assurance representative, or with a statement pointing out deficiencies to the proposed methods and forms. In the event of the latter, the contractor shall resubmit his revised methods and forms. The approved forms shall be used for preparation of the test data sheets for the testing of all items on the contract.

**3.3.2 Testing:**

On all items, the contractor shall perform all of the required tests utilizing the government approved test procedures and furnish test data on the approved forms as specified in 3.3.3. The test data must substantiate that the item meets contract requirements and shall include the statement, "This certifies that this item fully meets all technical requirements of the contract", and shall be dated and signed by a responsible contractor official. Test data copies shall be furnished as specified in 3.3.3.

**3.3.3 Product Acceptance Test Data Forms:**

The contractor shall prepare test data forms for each item subjected to test. The title page for each set of test data forms shall show the item name, national stock number (NSN), type designation and serial number, specification number and date, and the contract number and date. The individual test form shall indicate for each test the applicable specification paragraph number, and the performance limits stated therein. The original test data form shall be signed by the contractor's test person. Copies may be made by use of carbon paper, or by means of a duplicating process. All copies of a given sheet shall carry identical test data. Blank forms shall be typed, lettered by mechanical means, or printed. Two (2) copies of all test data are required. One (1) copy shall accompany the product tested and the second copy shall be furnished to the FAA quality assurance representative. If no FAA quality assurance representative is present the second copy shall be forwarded to the FAA contracting officer or his designated technical representative.

**3.3.4 Measuring and Test Equipment:**

The contractor shall provide and maintain all measuring and test equipment in accordance with ISO 10012-1 and NCSL Z540-1.

**4. QUALITY ASSURANCE PROVISIONS****4.1 Inspection Point:**

At the discretion of the FAA, inspection may be accomplished at either the repair source or at the FAA Logistic Center. When inspection is accomplished at the repair source, all items shall be subject to inspection and/or verification testing by the FAA's quality assurance representative prior to shipment unless otherwise specified by the contract officer.

**4.2 Inspection Criteria:**

Repaired items may be subject to either lot-by-lot or continuous sampling plans as determined by the FAA. In either case, the acceptable quality level will be 1.0 percent for critical defects, 5.0 percent for major defects and 10.0 percent for minor defects, as defined in Appendix 1.

**4.3 Rejected Items:**

Rejected items shall be reworked by the contractor at no cost to the government and be clearly identified as rework when resubmitted for inspection.

**5. PREPARATION FOR DELIVERY****5.1 Preparation for Delivery:**

The item will be prepared for delivery as provided in the contract.

**6. NOTES****6.1 Information Items:**

The contents of this section are only for the information of the initiator of the procurement request and are not a part of the requirements of this specification. They are not contract requirements nor are they binding on either the government or the contractor. In order for these terms to become a part of the resulting contract, they must be specifically incorporated in the schedule of the contract. Any reliance placed by the contractor on the information in these subparagraphs is wholly at the contractor's risk.

**6.2 Specified Items:**

The following items should be specified in the contract:

**PERFORMANCE SPECIFICATION**

Salient performance characteristics should be specified in the contract when they are not otherwise included in a referenced FAA instruction book, FAA handbook, original manufacturer instruction book, or drawings. The contract should require test-bed evaluation for final acceptance when applicable. Performance Data Record (PDR) requirements should also be included in the contract when available.

**GOVERNMENT FURNISHED EQUIPMENT (GFE)**

Any GFE required to perform necessary tests.

**MODIFICATIONS**

Modifications applicable to the unit to be repaired.

**PARTS PECULIAR**

Any parts peculiar required to install approved modifications.

## APPENDIX 1

### CLASSIFICATION OF DEFECTS

#### CRITICAL DEFECT:

A critical defect is a defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product.

#### MAJOR DEFECT:

A major defect is a defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

#### MINOR DEFECT:

A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

VA-963A KLYSTRON  
Drawing 354D362  
RADAR Equipment  
Manufacturer Requirement  
Dated August 18, 1981  
FAA Revised 12/10/99

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
FAA LOGISTIC CENTER PERFORMANCE SPECIFICATION AND  
ACCEPTANCE TESTS FOR THE FAA "L" BAND ARSR-3 RADAR KLYSTRON

X-RAY LEVEL LIMITS HAVE BEEN REVISED TO MEET FAA ORDER 3900.19B, FAA  
OCCUPATIONAL SAFETY AND HEALTH PROGRAM , DATED 4/29/99  
REQUIREMENTS. ITEM 5.6.2 OF THIS TEST PROCEDURE HAS BEEN CHANGED TO  
DEFINE THE LATEST REQUIREMENT FOR THIS TUBE.

# GENERAL CHARACTERISTICS<sup>1</sup>

## ELECTRICAL

Frequency Range .....	1.25-1.35 GHz
Output Power, peak .....	5.0 MW
Heater Voltage .....	11.0 V
Heater Current, at 11.0 V, typ .....	18.5 A
Heater Surge Current, max .....	30 A
Heater Warm-up Time, min .....	10 min
Interelectrode Capacitance	
Anode-to-Cathode .....	30 pF
Focusing .....	VA-1963 Electromagnet
Magnet Voltage, max .....	90 V
Magnet Current, max .....	22 A

## PHYSICAL

Dimensions .....	See Outline Drawing
Weight, approx	
Tube .....	200 lb
Magnet .....	700 lb
Mounting Position .....	Any
High-Voltage Seal Insulation .....	Oil
X-ray Shielding .....	Required
Cooling .....	Liquid
Outlet Temperature, max .....	80 °C

## COOLING

The tube and electromagnet require a cooling system capable of dissipating about 30 kilowatts. Distilled water is the preferred coolant. Metals in the circulating system should be close to copper in the galvanic series. Maximum coolant outlet temperature of 80 °C is for cooling sys-

tems operating at atmospheric pressure at sea level. For different coolants or operating conditions, contact the nearest Varian Sales Office or the Palo Alto Tube Division for recommendations.

Water Flow, min

Collector .....	10 gal/min
Body .....	2 gal/min
Electromagnet .....	2 gal/min

Pressure Drop, at min flow

Collector .....	30 lbf/in <sup>2</sup>
Body .....	30 lbf/in <sup>2</sup>
Electromagnet .....	30 lbf/in <sup>2</sup>

## OPERATING CONDITIONS AND RATINGS

	Typical. Operation <sup>1</sup>	Range Values for Equipment Design <sup>2</sup>		Maximum Ratings <sup>3</sup>	
		Min	Max		
Frequency .....	1.32	1.25	1.35	---	GHz
Output Power, peak .....	5.25	---	7.0	7.0	MW
Output Power, average .....	6.3	---	11.0	11.0	kW
Drive Power, peak .....	50	---	70	75	W
Pulse Duration, beam .....	3	1	7	8	μs
Gain, at saturation .....	50	---	---	---	dB
Efficiency <sup>4</sup> .....	40	---	---	---	%
Bandwidth, 1-dB .....	35	15	---	---	MHz
Beam Voltage, peak .....	130	---	135	140	kV
Beam Current, peak .....	101	---	110	115	A
Beam Power, average .....	15.8	---	30	30	kW
Load VSWR .....	1.05:1	---	---	1.5:1	

### NOTES:

1. Characteristics and operating values are based on performance tests. These figures may change without notice as a result of additional data or product refinement. The Varian Palo Alto Tube Division should be consulted before using this information for final equipment design.

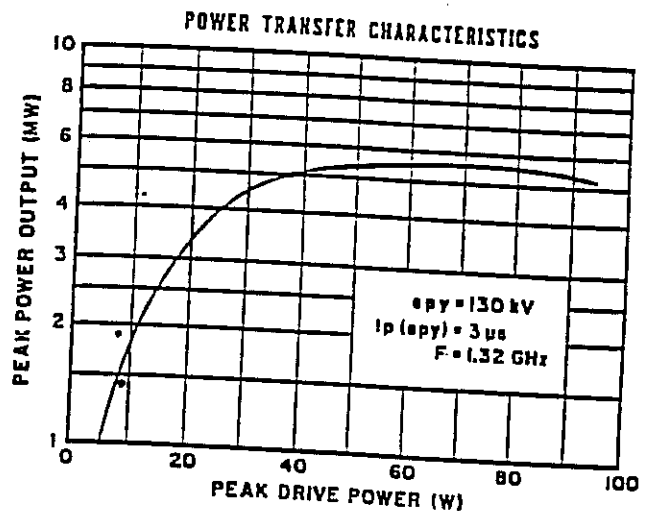
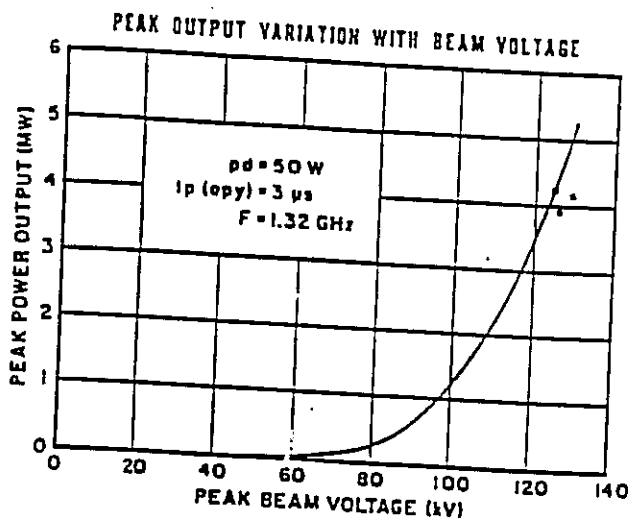
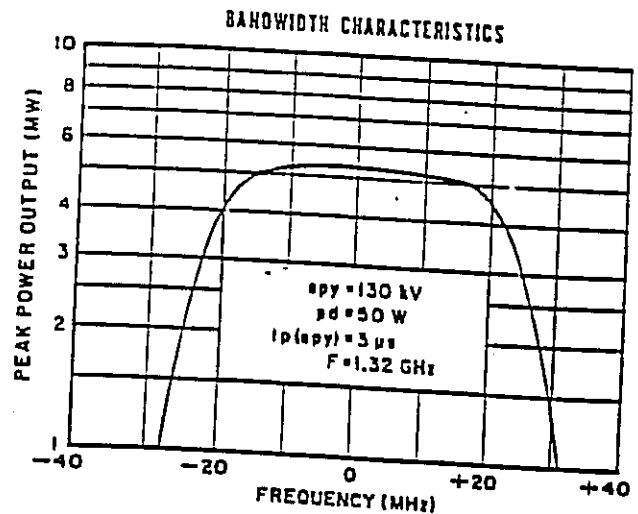
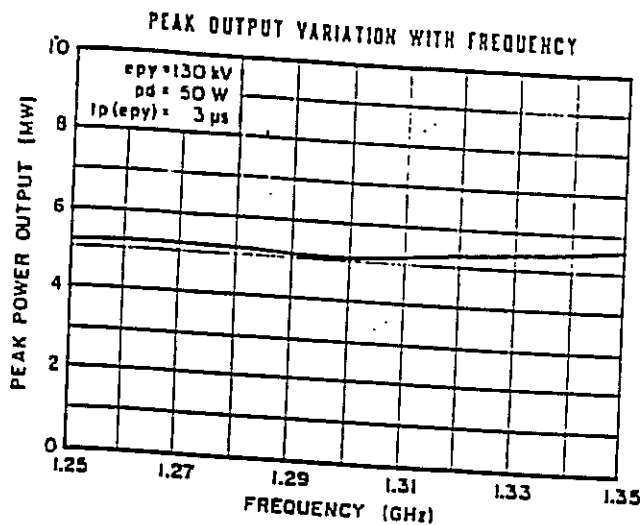
2. These figures represent the range of operating values which may be used with the VA-963A. Equipment design should allow for these variations.

3. Ratings should not be exceeded under continuous or transient conditions. A single rating may be the limitations and simultaneous operation at more than one rating may not be possible. Equipment design should limit voltage and environmental variations so that ratings will never be exceeded.

4. Peak output power divided by peak input power.

# CHARACTERISTIC CURVES

Typical performance values



## OPERATING HAZARDS

Read the following and take all necessary precautions to protect personnel. Safe operating conditions are the responsibility of the equipment designer and the user.

**High Voltage.** This tube operates at voltages which can be deadly. Equipment must be designed so personnel cannot come in contact with operating voltages. Enclose high-voltage circuits and terminals and provide fail-safe interlocking switch circuits to open the primary circuits of the power supply and to discharge high-voltage condensers whenever access is required.

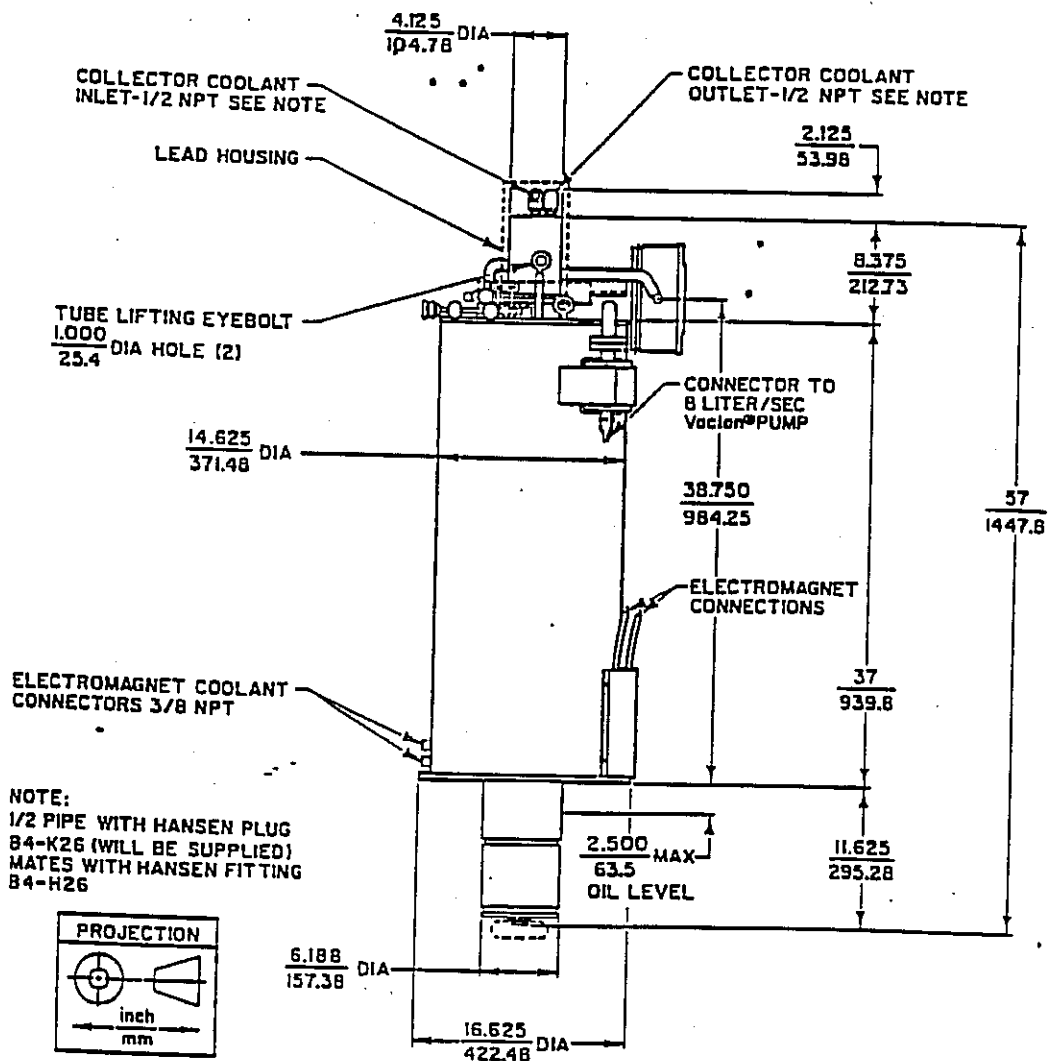
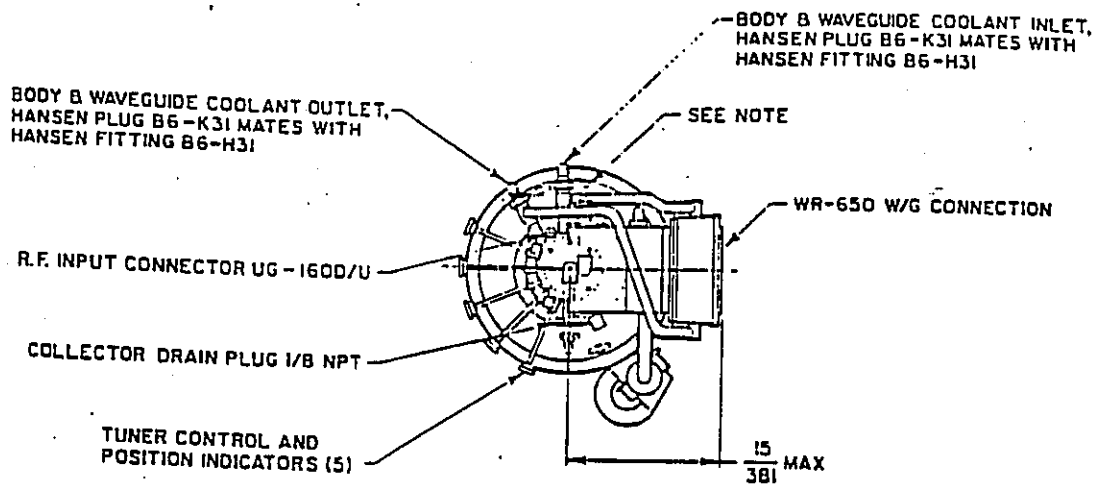
**Microwave Radiation.** Exposure of the human body to microwave radiation in excess of 1 milliwatt per square centimeter is unsafe and can result in blindness or other injury. Personnel must be fully protected from the microwave energy which radiates from this device. All input and output r-f connections, waveguide flanges, and gaskets must be r-f leakproof and

properly engaged. Never operate this device without a microwave-energy-absorbing load attached. Personnel must be prevented from looking into open waveguides or antennas while such a device is energized. (Ref. Proc. IRE, Vol. 49, No. 2, pp. 427-447, Feb. 1961).

**X Rays.** This device may produce X-ray radiation when energized. Operating personnel must be protected by appropriate shielding. Provide adequate X-ray shielding on all sides of this device, as well as the modulator and pulse transformer tanks. X-ray caution signs or labels must be permanently attached to equipment directing operating personnel never to operate this device without X-ray shielding in place.

Equipment must be designed to fully safeguard all personnel from these hazards. Labels and caution notices must be provided on equipment and in manuals clearly warning of those hazards which cannot be avoided.

# OUTLINE DRAWING



ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

1.0 PURPOSE

This document defines the parameters and methods required to assess the performance of VA-963A pulse L-band tunable power amplifier klystron electron tube.

The tests as delineated will not necessarily be performed in the order presented in this document. A prerequisite of performing acceptance testing is that sufficient preliminary testing has been accomplished to define electrical parameters and assess general tube performance. The requirements stated in Westinghouse PDS 22622, but not included in these test procedures, are not deleted from the requirements of the tube. These requirements have been established by previous test or calculated and are considered to be inherent with all tubes and do not require acceptance testing.

2.0 EQUIPMENT REQUIREMENTS

The test equipment given in paragraph 2.2, or its equivalent, will be used in the acceptance testing of the VA-963A.

2.1 Equipment Calibration

The calibrations and control of the test equipment will be performed by Instrument Services under the direction of Quality Assurance. Controls and procedures for calibration are specified in Quality Assurance Operating Procedures Manual 87-800 154 and Instrument Services Operating Manual 87-800 153.

2.2 Test Equipment and Facilities

2.2.1	Input Directional Couplers	Narda 3042-10, 3002-10
2.2.2	Output Directional Couplers	GD 7719888G1, Narda 3002-30
2.2.3	Power Bridges	hp 431C 3012-10
2.2.4	Coaxial Thermistor Mounts	hp 478A
2.2.5	Frequency Meter	hp 536A

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

2.2.6	Crystal Detectors	hp 420
2.2.7	Low Pass Filters	hp 360C
2.2.8	Attenuators	hp 8491A, Narda 75-3
2.2.9	Spectrum Analyzer	hp 8551B/851B, 8551B/852A, or equivalent
2.2.10	Water Load	
2.2.11	Thermometers	
2.2.12	Water Load Flow Meter	Shurts & Koerting 60-04-731
2.2.13	Oscilloscope	Tektronix 535
2.2.14	Oscilloscope Preamps	Tektronix Z
2.2.15	Modulator	VA-812 test position
2.2.16	Differential Pressure Gauge	ITT Barton 227-55613
2.2.17	Body Coolant Flow Meter	Shurts & Koerting 63-08-516
2.2.18	Collector Coolant Flow Meter	Brooks 13-3621-1118-6311
2.2.19	Input Circulator	Melabs HL-3-1300
2.2.20	Sweep Oscillator	hp 8690A
2.2.21	PIN Modulator	hp 8731B
2.2.22	TWT Driver	VTL-6141A2 or VTL-6141A1
2.2.23	Radiation Meter	Victoreen 440 RF
2.2.24	Rf Modulator	hp 8403A
2.2.25	x-y Recorder	hp 135M
2.2.26	Electronic Counter	hp 5321A
2.2.27	Scope Camera	hp 197A
2.2.28	WG Load Transformer	Varian
2.2.29	High Pass Filter	WR 430 Waveguide Assy.

3.0 APPLICABLE DOCUMENTS

Westinghouse Drawing 354D362, Tube Outline, latest revision

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

4.0 KLYSTRON INSTALLATION PROCEDURE

1. Place klystron in VA-1963 series electromagnet.
2. Make input and output rf connections.
3. Connect collector and body water lines.
4. Make all electrical connections to the tube. Preliminary to any application of voltages, check the operation of all interlock circuits.

NOTE: Westinghouse Purchase Specification PDS 22622 specified:

tp (video) = 3.0  $\mu$ sec (min)  
tp (rf) = 2.0  $\mu$ sec (min)  
prf = 365 pulses per second  
D<sub>1</sub> (rf) = 0.00073 (min)

Other pulse lengths and repetition rates may be used during factory testing. The resulting duty cycle will always equal or exceed the above.

5.0 DESCRIPTION OF PRODUCTION TESTS

5.1 Vacuum Test

5.1.1 Procedure

After 48 hour holding period, with no operating voltages on klystron, turn on VacIon<sup>®</sup> supply for 15 minutes. Record VacIon pressure on TPS 1.

5.1.2 Verification

Pressure should be less than  $10^{-7}$  torr.

5.2 Heater Current

5.2.1 Procedure

Apply heater voltage and adjust to nameplate value (NPV). The surge current should be limited to less than 40 amperes. After 20 minutes, read and record heater current on TPS 2.

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

5.2.2 Verification

Filament current shall not exceed 22 amperes.

5.3 Cathode Current

5.3.1 Procedure

Operate klystron at  $E_f = NPV \text{ Vac}$ ,  $e_{py} = 135 \text{ kV}$  and record cathode current on TPS 2.

5.3.2 Verification

The cathode current shall be greater than 99 amperes, but not to exceed 112 amperes.

5.4 Emission

5.4.1 Procedure

Operate klystron as in paragraph 5.3. Reduce heater voltage by 1.0 volt from NPV.. Allow cathode emission to stabilize and record change in cathode current on TPS 2.

5.4.2 Verification

Cathode current change is not to exceed 5.0 amperes.

5.5 RF Output Power (1)

5.5.1 Procedure

1. Operate the klystron over the frequency range 1.25 to 1.35 GHz. Beam voltage 130 kV (max). Measure output power every 10 MHz. Peak drive power will not exceed 40 watts.  $E_f = \text{nameplate value}$ , 11.5 V (max). Isol equals nameplate value, 20 A (max). Waveguide pressure = 15 psig.
2. Record the following on TPS 3.

Power output, beam voltage, cathode current, drive power, tuner position, magnet current, 1 dB BW and 3 dB BW. Recorded data from this test is to be used to generate tuning chart.

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

5.5.2 Verification

Po shall be greater than 5 MW over frequency range. The 3 dB BW shall be  $\geq 5$  MHz and  $\leq 30$  MHz.

5.6 X-ray

5.6.1 Procedure

1. Set operating conditions as in Power Output 1 (Para. 5.5), except,  $F_o = 1300$  MHz. Adjust epy for po of 5.5 MW or 13.9 MW input peak power whichever is less. Obtain video duty of 0.0011 minimum and rf duty of 0.00073 minimum by adjusting the pulse repetition rate.
2. Record x-ray emission level taken with hand survey meter on TPS 1.

5.6.2 Verification

X-ray level shall be less than 1 mR/hr at 6 inches from the tube.

5.7 Power Output 2

5.7.1 Procedure

Set operating conditions as in Power Output 1 (Para. 5.5) except,  $F_o = 1250, 1300$  and  $1350$  MHz. Adjust epy for po of 6.5 MW. Record epy, pd on TPS 4.

5.7.2 Verification

Epy shall not exceed 145 kV.

5.8 Power Output 3

5.8.1 Procedure

Set operating conditions as in Power Output 1 (Para. 5.5.1) except,  $F_o = 1250, 1300$  and  $1350$  MHz. Adjust epy for po of 3.5 MW and record epy, pd on TPS 4.

5.8.2 Verification

Drive power not to exceed 35 watts.

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

5.9 Hydrostatic Pressure

5.9.1 Procedure

A hydrostatic pressure of 150 psig shall be applied to the collector and body circuits for 15 minutes.

5.9.2 Verification

There shall be no visible leakage and no damage.

5.10 Waveguide Pressurization (non-operating)

5.10.1 Procedure

The rf output window flange will be sealed by a flat cover plate and Parker seal, and pressurized to 30 psig.

5.10.2 Verification

Pressure will be 28 psig, or greater, after 15 minutes.

5.11 Dimensions

5.11.1 Procedure

The tube shall be inspected to Westinghouse drawing 354D362, latest revision.

5.12 Pressure Drop, Collector

5.12.1 Procedure

1. With water at  $25^{\circ} \pm 5^{\circ}\text{C}$  and 10 GPM flow through the collector, the pressure drop shall not exceed 20 psi.

2. Record pressure drop on TPS 1.

5.13 Pressure Drop, Body

5.13.1 Procedure

1. With water at  $25^{\circ} \pm 5^{\circ}\text{C}$  and 2 GPM flow through the body, the pressure drop shall not exceed 20 psi.

2. Record pressure drop on TPS 2.

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6.0 DESCRIPTION OF QUALIFICATION TESTS (Will be performed only when specifically required by contract)

6.1 Noise (1)

6.1.1 Procedure

1. Operate the klystron at specified Power Output 1 conditions, except  $F_o = 1300$  MHz.
2. Record spectrum analyzer response with rf drive applied. Remove rf drive and record spectrum analyzer response over the nominal bandwidth of the output waveguide. The spectrum analyzer bandwidth shall be approximately  $1/t_p$  rf in this measurement.

6.1.2 Verification

The change in spectrum analyzer response shall be greater than 90 dB.

6.2 Noise (2)

6.2.1 Procedure

Same operating conditions as Power Output 1 (Para. 5.5), except  $F_o = 1300$  MHz. Upon establishing calibrated reference levels on Spectrum Analyzer of Noise 1, vary beam voltage from 110 to 145 kV.

6.2.2 Verification

When checked visually, the spectrum analyzer response shall be greater than the 90 dB reference established.

6.3 Spurious Output (1)

6.3.1 Procedure (1)

1. Operate the klystron at 1350 MHz in Power Output 1 conditions.
2. Record spectrum analyzer response to the output spectrum over the frequency range from 900 MHz to 1400 MHz.

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3. Insert the 1200 MHz low pass filter at the spectrum analyzer input and remove 50 dB attenuation.
4. Record spectrum analyzer response from 900 MHz to 1400 MHz.

6.3.2 Verification

There shall be no spurious response greater than -90 dB with respect to the output spectrum of the klystron in the frequency range from 900 to 1200 MHz.

6.3.3 Procedure (2)

1. Operate the klystron at 1350 MHz in Power Output 1 conditions.
2. Spectrum analyzer response to the output spectrum over the frequency range from 1200 to 1700 MHz.
3. Insert the 1400 MHz high-pass filter at the spectrum analyzer input and remove 50 dB attenuation.
4. Record spectrum analyzer response from 1200 to 1700 MHz.

6.3.4 Verification

There shall be no spurious response greater than -90 dB with respect to the output spectrum of the klystron in the frequency range from 1500 to 1700 MHz.

6.4 Spurious Output (2)

6.4.1 Procedure

Same as Spurious 1 (Para 6.3) except, adjust epy for po of 3.5 MW. Record same as Spurious 1 (Para 6.3).

6.4.2 Verification

Same as Spurious 1 (Para 6.3.2).

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6.5 Spurious Output (3)

6.5.1 Procedure

Same as Spurious 1 (Para 6.3) except, adjust epy for po of 6.5 MW. Record same as Spurious 1, 6.2.1.

6.5.2 Verification

Same as Spurious 1 (Para 6.3.2).

6.6 Load VSWR (1)

6.6.1 Procedure (1)

The tube will be operated at 1300 MHz and into a nominal load VSWR of 1.5:1. The phase of the mismatch will be varied over six positions. Swept or point-by-point po data will be taken. (Returning of the tube, adjustment of the electromagnet current and the drive power are allowed in order to demonstrate one time the above performance.)

6.6.2 Verificaition

The po shall be greater than 5 MW at epy 140 kW maximum.

6.7 Load VSWR (2)

6.7.1 Procedure

Same as VSWR 1 (Para 6.6) except, nominal load VSWR of 2:1.

6.7.2 Verification

Tube shall sustain no damage.

6.8 Load VSWR (3)

6.8.1 Procedure

Same as VSWR 1 (Para 6.6) except, nominal load VSWR of 3:1 at single phase position.

6.8.2 Verification

Tube shall sustain no damage.

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(Westinghouse Drawing 354D362, ARSR-3)

6.9 Heater Warm-up

6.9.1 Procedure

Same test conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Set heater voltage to nameplate value. After 15 minutes of heater warm-up time, adjust epy to 130 kV.

Record po 5 minutes after application of epy.

6.9.2 Verification

The po shall be greater than 5 MW.

6.10 Heater Current Interruption

6.10.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  Mhz. Interrupt heater current for 5 seconds and return heater current and epy to nameplate value.

6.10.2 Verification

Tube shall sustain no damage and po shall be greater than 5 MW.

6.11 Heater Voltage Variation (1)

6.11.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Vary heater voltage by  $\pm 5\%$  from nameplate value. Allow 10 minute interval between variations.

6.11.2 Verification

Po shall be greater than 5 MW in both cases.

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

6.12 Heater Voltage Variation (2)

6.12.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5) except  $F_o = 1300$  MHz. Vary heater voltage by  $\pm 10\%$  from nameplate value. Allow 10 minute interval between variations.

6.12.2 Verification

Tube shall sustain no damage.

6.13 RF Performance (1)

6.13.1 Procedure

Set operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1250, 1300$  and  $1350$  MHz. Adjust epy for po of 6.5 MW and video duty to 0.0015 min.

6.13.2 Verification

Tube shall sustain no damage after 5 minutes of operation at each frequency.

6.14 RF Performance (2)

6.14.1 Procedure

Set operating conditions as in Power Output 1 (Para 5.5) except, video duty will be adjusted to 0.0015 minimum and  $F_o = 1250, 1300, 1350$  MHz.

6.14.2 Verification

Tube shall sustain no damage after 30 minutes of operation at each frequency.

6.15 RF Performance (3)

6.15.1 Procedure

1. Set operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1250, 1300$  and  $1350$  MHz.

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2. Record po versus frequency using an X-Y recorder for each frequency.

6.15.2 Verification

The output power ripple shall not exceed 0.2 dB within the band of  $F_o \pm 0.5$  MHz.

6.16 Overdrive (1)

6.16.1 Procedure

Same conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Increase pd by 3 dB from nameplate value.

6.16.2 Verification

No break-up or induced oscillation shall be observed on the detected rf output pulse as viewed through the output crystal detector.

6.17 Overdrive (2)

6.17.1 Procedure

Same conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Adjust epy for po of 6.5 MW and increase pd by 3 dB from nameplate value.

6.17.2 Verification

No break-up or induced oscillation shall be observed on the output pulse as viewed through the output crystal detector.

6.18 Overdrive (3)

6.18.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Adjust epy for po of 3.5 MW and increase pd by 3 dB from nameplate value.

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

6.18.2 Verification

No break-up or induced oscillations shall be observed on the output pulse as viewed through the output crystal detector.

6.19 Beam Focusing, Magnet Current Variation (1)

6.19.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Vary magnet current by  $\pm 5\%$  from nameplate value.

6.19.2 Verification

The po shall not change by more than 0.5 dB.

6.20 Beam Focusing Magnet Current Variation (2)

6.20.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5) except,  $F_o = 1300$  MHz. Vary magnet current by  $\pm 10\%$  from nameplate value.

6.20.2 Verification

The tube shall sustain no damage.

6.21 Beam Pulse Voltage Overshoot

6.21.1 Procedure

Same operating conditions as in Power Output 1 (Para 5.5). Momentarily increase beam voltage by 10% from nameplate value.

6.21.2 Verification

The tube shall sustain no damage.

ACCEPTANCE TEST PROCEDURE - VA-963A  
(Westinghouse Drawing 354D362, ARSR-3)

6.22 Beam Pulse Inverse Voltage

6.22.1 Procedure

With the tube suspended in air, an inverse voltage of 35 kV dc will be applied between cathode and anode terminals for 60 seconds.

6.22.2 Verification

The tube shall sustain no damage.

7.0 GLOSSARY OF TERMS, SYMBOLS, AND ACRONYMS

A	Amperes (may be either ac, rms or dc)
a	Peak, amperes
ATP	Acceptance Test Procedure
BW	Bandwidth
°C	Degrees Centigrade
CW	Continuous Wave Radio Frequency Energy
dB	Decibels
Du	Duty Cycle Product of Pulse Duration and Pulse Recurrence Rate
dc	Direct Current
Ef	Cathode Heater Voltage
If	Cathode Heater Current
epy	Pulse Anode Voltage
Fo	Center Operating Frequency
GHz	Gigahertz
GPM	Gallon Per Minute
Ik	Peak Cathode Current
Isol	Electromagnet Coil Current
kV	Peak Kilovolts
kW	Kilowatts
MAX	Maximum
MIN	Minimum
MHz	Megahertz
Mr/hr	Milliroentgen Per Hour
μsec	Microseconds
MW	Megawatts